April 1958

data

HANDBOOK FOR THE GOVERNMENT CONTRACTOR

Army Redstone ready for launch

SPECIAL ISSUE

missile handbook for contractors

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Features: MARTIN CAIDIN
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April 1958

. . . a special issue
devoted to the American Businessman
who wants to know . . .

1. What missiles the U.S. is now producing
2. An explanation of the specific task of each missile
3. The prime contractor assigned to each U.S. missile
4. The major subcontractors for each missile and a brief insight into the components that are their responsibilities

SUBSCRIPTION RATES: U.S. — $12.00 for 1 year; $22.00 for 2 years. Foreign — $15.00 for 1 year; $28.00 for 2 years. Available to Government personnel through Federal Supply Schedule, FSS Stock Requisition Number 7630-148, Index No. 1256, FSS Section 76, Page 90. Checks may be made payable to DATA.

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DATA PUBLICATIONS

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GUIDED MISSILES of the United States

The ARMY has announced the following guided missiles:

Surface-to-Air

NIKE-AJAX
NIKE-HERCULES
NIKE-ZEUS
HAWK
TALOS DEFENSE UNIT

Surface-to-Surface

JUPITER IRBM
REDSTONE (Phasing Out)
CORPORAL
LACROSSE
SERGEANT
HONEST JOHN
LITTLE JOHN
DART
PERSHING

Anti-missile System

PROJECT PLATO

The NAVY has announced the following guided missiles:

Surface-to-Air

TERRIER
TALOS
TARTAR

Air-to-Air

SIDEWINDER
SPARROW I
SPARROW II
SPARROW III

Air-to-Surface

PETREL
BULLPUP
CORVUS

Surface-to-Surface

REGULUS I
REGULUS II
POLARIS

Surface-to-Underwater

RAT WEAPON ABLE
TRITON (Cancelled Sept. 1957)

The AIR FORCE has announced the following guided missiles:

Surface-to-Air

BOMARC

Surface-to-Surface

MATADOR
MACE
SNARK
THOR
ATLAS
TITAN

Air-to-Air

FALCON
GENIE

Air-to-Surface

RASCAL
HOUND DOG

Diversionary

GREEN QUAIL
BULL GOOSE

NIKE-AJAX

Named NIKE after Greek goddess of victory, it is Army's first supersonic antiaircraft guided missile designed to intercept and destroy enemy targets regardless of evasive action. NIKE guided missile units are now deployed around vital industrial, highly populated and strategic areas of United States. NIKE-AJAX is about 20 feet long and about one foot in diameter, with two sets of fins for guidance and steering. It is boosted to supersonic velocity by solid-propellant booster and maintained by liguid sustainer motor. Missile and booster weigh more than one ton. Speed, range, altitude and lethality of NIKE-AJAX can meet an attack from any direction and its kill potential has far exceeded expectations. There are 12 launchers in each NIKE battery, which is operated by approximately 100 officers and men.

Contractors:

Primes: Electric Co., New York, N. Y.
Western Electric Co., New York, N. Y.

Principal Subcontractors:

Douglas Aircraft Co., Charlotte, N. C.
Missile airframe

NIKE-HERCULES

NIKE-HERCULES will be nation's second land-based combat-ready surface-to-air guided missile system to be placed by Army into air defense system of United States. NIKE-HERCULES missile is an integral part of a weapon system which electronically acquires the target and causes the missile to intercept target. Missile can engage and destroy at much longer ranges and higher altitudes than NIKE-AJAX either single, or formations of, aircraft of present or foreseeable future. Dart-shaped missile alone is 27 feet long; booster is 14.5 feet long. Missile is launched by remote control and is given its initial impetus by a solid propellant booster rocket and then accelerated by a solid sustainer motor. Atomic warhead is designed to insure that detonation can only occur at altitudes sufficiently high to prevent damage to friendly surrounding terrain.

Contractors:

Primes:

Western Electric Co., New York, N. Y.
Douglas Aircraft Company, Charlotte, N. C.
Missile (exclusive of guidance section), ground area equipment, assembly area equipment

Principal Subcontractors:

Consolidated Western Steel, Los Angeles, Calif.
Launchers
Goodyear Aircraft Co., Akron, Ohio
Boosters

Borg-Warner, Kalamazoo, Mich.
Metal parts for boosters

NIKE-ZEUS

NIKE-ZEUS a surface-to-air missile system under development to provide an anti-missile defense against intercontinental ballistic missiles equipped with nuclear warheads that could strike United States. NIKE-ZEUS is being pursued by Army with development in the hands of same contractor team that developed the earlier members of NIKE family--NIKE-AJAX and NIKE-HERCULES.

Contractors:

Primes:

Western Electric Co., New York, N. Y.

Principal Subcontractors

Douglas Aircraft Co., Santa Monica, Calif.
Missile; launching and handling equipment

Grand Central Rocket Co., Redlands, Calif.
Propellant

HAWK

HAWK is Army's newest air defense weapon capable of carrying a modern warhead and of destroying attackers flying at low altitudes and at such ranges as to insure effective protection of defended areas. When placed in service, it will complement defense against high-level air-attack provided by the Army's NIKE system. System is capable of operation both in the continental United States air defense system at fixed Army installations and with fast-moving combat troops of field Army. The missile uses a solid fuel propellant and is approximately 17 feet long and 14 inches in diameter.

Contractors:

Primes:

Raytheon Manufacturing Co., Bedford, Mass.
System

Principal Subcontractors:

Aerojet-General Corp., Sacramento, Calif.
Motor (single chamber)

Northrop Aircraft Corp., Hawthorne, Calif.
Airframe and launcher

Picatinny Arsenal, Dover, N. J.
Warhead and allied accessories

Food Machinery and Chemical Corp., San Jose, Calif.
Loader

TALOS

Land-based version of the Navy's TALOS Shipboard Missile system. TALOS Defense Unit was turned over to Army by Navy on October 15, 1957, at White Sands Proving Ground, New Mexico, for evaluation. Army is studying missile system to see if it can be integrated into present Army Air Defense System. TALOS has range capability comparable to that of NIKE-HERCULES and will be capable of carrying an atomic warhead.

Contractors:

Primes:

Bendix Aviation Corp., Mishawaka, Ind.
(Shipborne)

Radio Corporation of America, Camden, N. J.
(Land-based)

Principal Subcontractors:

McDonnell Aircraft Corp., St. Louis, Mo.
Airframe, propulsion

Allegany Ballistics Laboratory, Cumberland, Md.
Propulsion

Farnsworth Electric Co., Fort Wayne, Ind.
Guidance

Bendix Aviation Corp., South Bend, Ind.
Propulsion

Bendix Radio Division, Baltimore, Md.
Control system

Sandia Corp., Albuquerque, N. M.
Warhead

Naval Ordnance Laboratory, White Oak, Md.
Warhead

New Mexico State College, Socorro, N. M.
Warhead

Naval Ordnance Laboratory, Corona, Calif.
Fuze

Diamond Ordnance Fuze Laboratory, Washington D. C.
Fuze

Melpar, Inc., Washington D. C.
Fuze

American Machine and Foundry Co., Brooklyn, N. Y.
Launching system

JUPITER

As an IRBM, Army is developing JUPITER to carry a nuclear warhead to range of 1500 miles. Mobility of JUPITER insures required flexibility to extend missile coverage to any target with accuracy. Mobility in turn assures greater capability as opposed to firing from fixed installations which are easy to detect prior to hostilities. First operational JUPITER unit will be deployed overseas in December.

Contractors:

Primes:

Army Ballistic Missile Agency, Huntsville, Ala.
Chrysler Corp., Detroit, Mich.

Principal Subcontractors:

North American Aviation, Los Angeles, Calif.
Rocket motor and associated equipment
Ford Instrument Co., Long Island, N. Y.
All-inertial guidance package

REDSTONE

Capable of carrying an atomic warhead, 200 mile range REDSTONE missile has flown successfully and achieved great accuracy. REDSTONE is in the hands of troops for training purposes now; and will be deployed in 1958 to our forces overseas. Army Ballistic Missile Agency at Huntsville, Ala., was set up to develop under high priority REDSTONE in 1956. Secretary of Defense has recently authorized Army to proceed with solid propellant, light weight missile which will eventually replace REDSTONE.

Contractors:

Primes:

Army Ballistic Missile Agency, Huntsville, Ala.
Chrysler Corp., Detroit, Mich.

Principal Subcontractors:

North American Aviation, Inc., Los Angeles, Calif.
Rocket motor and associated equipment
Ford Instrument Division, Sperry Rand Co., Long Island City, N. Y.
Reynolds Metal Company, Louisville, Ky.
Missile fuselage

CORPORAL

Equipped with either an atomic or conventional type warhead, CORPORAL guided missile is capable of engaging tactical targets at ranges over 75 miles away. Weapon gives field commander great firepower on battlefield and enables him to strike selected targets deep in enemy rear areas. CORPORAL follows a ballistic trajectory during most of its flight to target. Weather and visibility conditions place no restriction on use of weapon. Propulsion system uses a liquid propellant rocket motor. Speed of missile in flight is several times speed of sound. CORPORAL battalions of 250 men per battalion have been deployed to Europe.

Contractors:

Primes:

Firestone Tire and Rubber Co., Los Angeles, Calif.
Gilfillan Brothers, Los Angeles, Calif.

Principal Subcontractors:

Cary Multiplier Co., San Gabriel, Calif.
Gyro, controls

Ryan Aeronautical, Inc., San Diego, Calif.
Motor

LACROSSE

LACROSSE is an all-weather guided missile capable of carrying highly effective area type warheads and sufficiently accurate for destroying hardpoint targets. LACROSSE will replace and supplement conventional artillery as a highly accurate general support field artillery guided missile for use in close tactical support of ground troops. Propulsion system uses solid propellant rocket motor. LACROSSE system includes missile, launcher mounted on standard Army truck, and other ground equipment.

Contractors:

Primes:

Cornell Aeronautical Laboratory, Buffalo, N. Y.
Responsible for entire system

The Martin Co., Baltimore, Md.
R&D co-contractor, system production

Thiokol Chemical Corp., Huntsville, Ala.
Motor Development

Principal Subcontractors:

Telecommunications Laboratory, Nutley, N. J.
Computer, DME (distance measuring equipment) angle tracer

Farrand Optical Company, Inc., New York, N. Y.
Target survey unit

SERGEANT

SERGEANT

SERGEANT is one of the Army's newer Research and Development projects. Ballistic guided SERGEANT missile will be sucessor to four-year-old CORPORAL, with improvements over older weapon's power, range, and accuracy. Missile will be invulnerable to electronic countermeasures.

Contractors:

Primes:

Jet Propulsion Laboratory, Pasadena, Calif.
System

Sperry Gyroscope Co., Salt Lake City, Utah
All critical R&D components

Principal Subcontractors:

Thiokol Chemical Corporation, Huntsville, Ala.
Motor

HONEST JOHN

Largest of Army's rockets, HONEST JOHN is guided by pointing the launcher. Rocket is now operational and is deployed in Europe and Far East. Army is presently engaged in a development program to improve the range, reliability and accuracy of HONEST JOHN.

Contractors:

Primes:

Emerson Electric Corp., St. Louis, Mo.

LITTLE JOHN

To achieve light-weight free rockets, Army is developing LITTLE JOHN. Weapon will be particularly well adapted to air-borne operations as it will be transported by helicopter. Rocket will be highly mobile in field and can be manhandled with considerably more ease than the HONEST JOHN.

Contractors:

Primes:

Emerson Electric Corp., St. Louis, Mo.

DART

Designed as an anti-tank missile, DART is capable of carrying a warhead which can defeat heaviest known enemy armor, and deliver warhead with pinpoint accuracy. DART missile can be launched by lightweight launcher from variety of vehicles. Missile was designed for increased effective range, higher accuracy at this longer range, greater probability of first round hit. Can accomodate larger head.

Contractors:

Primes:

Aerophysics Development Corp., Santa Monica, Calif.
Utica Bend Corp., Utica, Mich.
Grand Central Rocket Co., Redlands, Calif.
Rocket motor, propellant manufacture and loading.

Principal Subcontractors:

Bulova Research and Development Laboratories, Flushing, N. Y.
Fuze
Whittaker Gyroscope Co., Van Nuys, Calif.
Gyroscope

PERSHING

Named after General John J. Pershing, new Army missile will soon be under development and will succeed REDSTONE. While retaining REDSTONE's mobility, field worthiness and accuracy, PERSHING will be smaller, lighter and even more mobile. New missile will provide Army with more versatile and flexible weapon to discharge its role on battlefields of the future. Solid propellant. No commercial contractor as yet. Development work being done at Army Ballistic Missile Agency, Huntsville, Ala.

ARMY Anti-missile System

PROJECT PLATO

Army anti-missile guided missile system will use NIKE-ZEUS. PLATO system will be used in defense of overseas installations of both U. S. and allied powers. Work was started on PLATO more than four years ago by Sylvania Electric. System is designed to be mobile and easily transportable.

Contractor:

Prime:

Sylvania Electric Products, Waltham, Mass.

TERRIER

TERRIER is an all-weather missile designed to intercept enemy aircraft at longer range and higher altitudes than conventional antiaircraft guns. 15-foot weapon weighs about 1.5 tons and has range of about 10 miles. Missile is suitable for shipboard use or beachhead operations with Marine Corps. One Marine antiaircraft battalion is now using TERRIER launched from mobile trailers. TERRIER is only mobile surface-to-air guided missile operated by ground forces today. Shipboard TERRIERS are selected automatically from magazine and loaded on launcher which is then trained, elevated, and fired by remote control.

Contractors:

Primes:

M. W. Kellog Co., Jersey City, N. J.
Booster and sustainer

Convair, Pomona, Calif.

Allegany Ballistics Laboratory, Cumberland, Md.
Propulsion

S. B. Hicks and Co., Hyde Park, Mass.
Booster and sustainer

Principal Subcontractors:

Diamond Ordnance Fuze Laboratory, Washington, D. C.
Fuze

Philco Corp., Philadelphia, Penna.
Fuze

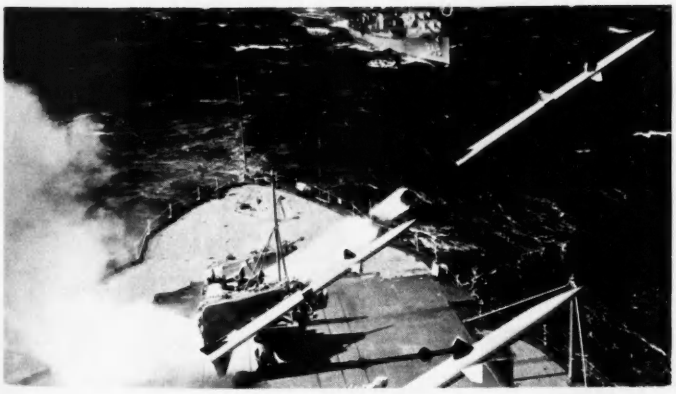
Eastman Kodak, Rochester, New York
Fuze

Elgin National Watch Co., Burbank, Calif.
Fuze

Bulova Watch Co., New York, N. Y.
Fuze

Bendix Pacific, Hollywood, Calif.
Hydraulics and air motor

Thompson Products, Cleveland, Ohio
Auxiliary power supply



TERRIER

TALOS

Named after Greek mythological demigod who guarded island of Crete, Navy's TALOS missile powered by 40,000 horsepower ramjet, is about 20 feet long and 30 inches in diameter. Weight of missile is 3,000 pounds. TALOS can destroy enemy aircraft at extremely high altitudes and has range of over 25 miles. Since ramjets must be boosted to supersonic speed, a solid-propellant rocket is utilized during the few seconds of boost phase. Booster falls away and ramjet engine takes over propulsion job. Missile is guided to target by mechanical brain within weapon. When it is within lethal range, proximity fuze detonates warhead. TALOS can carry either high-explosive or nuclear warheads, and can destroy supersonic or subsonic targets.

Contractors:

Primes:

Principal subcontractors: Both prime contractors and principal subcontractors are the same as those listed for the Army's landbased TALOS on page 4-6.

TARTAR

Navy's TARTAR designed especially for use aboard destroyers is best described as a junior version of TERRIER missile, but has about same range. TARTAR is designed for use from ships as small as destroyers, and for secondary battery use from cruisers. Missile will be installed in guided missile destroyers DDG's 2-9 which are now being built.

Contractors:

Primes:

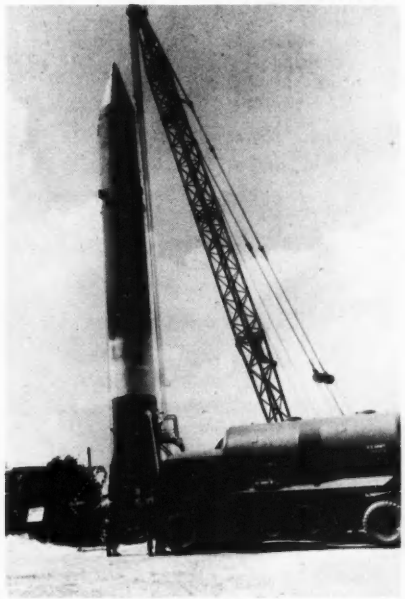
Applied Physics Laboratory, Silver Spring, Md.
Convair, Pomona, Calif.
Allegany Ballistics Laboratory, Cumberland, Md.
Propulsion
Naval Ordnance Laboratory, White Oak, Md.
Warhead
New Mexico Institute of Mines and Technology, Socorro, N. M.
Warhead
Bendix Pacific Corp., Santa Monica, Calif.
Fuze
Philco Corp., Philadelphia, Penna.
Fuze
Aerojet General Corp., Sacramento, Calif.
Propulsion
Vitro Laboratory, Silver Spring, Md.
Systems engineering

Raytheon Manufacturing Corp., Wayland, Mass.
Radar
Ford Instrument Co., Long Island, N. Y.
Computer
General Electric Co., Pittsfield, Mass.
Director
Bell Laboratories, Whippany, N. J.
Weapon control equipment

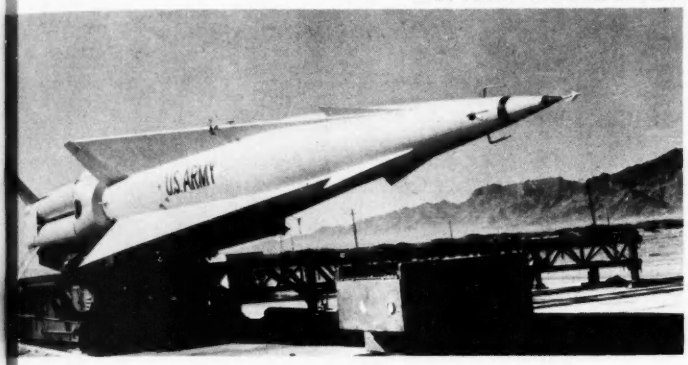
Principal Subcontractors:

Varian Associates, Palo Alto, Calif.
Power tubes

REDSTONE



NIKE-HERCULES



HAWK

DART

SIDEWINDER

SIDEWINDER is Navy's newest air-to-air guided missile. Named after desert rattlesnake of same name. Missile is guided by infrared or heat seeking device. SIDEWINDER seeks target by homing on heat emitting from target aircraft. It is an inexpensive, reliable weapon measuring 9 feet in length and weighing 155 pounds. Missile is designed for destroying high-performance enemy fighters and bombers from sea level to altitudes over 50,000 feet. New missile has very few moving parts and no more electronic components than an ordinary radio. SIDEWINDER requires no specialized technical training to handle and assemble effectively.

Contractors:

Primes:

Philco Corp., Philadelphia, Penna.
General Electric Co., Utica, N. Y.
Norris-Thermodor, Los Angeles, Calif.
Hunter Douglas, Riverside, Calif.
Philco Corp., Philadelphia, Penna.
Guidance
Eastman Kodak Co., Rochester, N. Y.
Fuze
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Fuze
Elgin Watch Co., Elgin, Ill.
Fuze
Baldwin Piano Co., Cincinnati, Ohio
Fuze
Naval Powder Factory, Indianhead, Md.
Propulsion grain
Houdaille Industries, Buffalo, N. Y.
Warhead
Naval Gun Factory, Washington, D. C.
Warhead
Naval Mine Depot, Yorktown, Va.
Warhead loading
Bulova Research Laboratory, Woodside, N. Y.
Fuze
Hamilton Watch Co., Lancaster, Penna.
Fuze
Beatrice Field Tank Co., Beatrice, Neb.
Shipping containers
Allied Federal Industries, Newark, N. J.
Warhead metal parts

Principal Subcontractors:

Electronic Corporation of America, Cambridge, Mass.
IR components

IR Industries, Needham, Mass.
IR components

Bausch and Lomb, Rochester, N. Y.
Guidance and control

American Machine and Foundry Co., Buffalo, N. Y.
Guidance

SPARROW I

SPARROW I is an air-to-air missile which became operational in the Fleet in spring of 1956. It is 12 feet long, weighs 300 pounds, and has speed of over 1,500 mph. SPARROW I is powered by solid-propellant rocket motor. After being fired from Navy fighters either singly or in rapid sequence salvos, SPARROW is guided to target by beam transmitted by launching aircraft's radar. It does not have nuclear capability. (Missile has been phased out of production.)

Contractors:

Primes:

Sperry Gyroscope Co., Great Neck, Long Island, N. Y.

Principal Subcontractors:

Douglas Aircraft Co., Inc., Santa Monica, Calif.
Airframe

Aerojet General Corp., Azusa, Calif.
Propulsion

Sperry Gyroscope Co., Great Neck, Long Island, N. Y.
Guidance

Tranter Manufacturing Co., Lansing, Mich.
Warhead

Congoleum-Nairn Co., Kearney, N. J.
Warhead

Bendix Aviation Corp., York, Penna.
Fuze

SPARROW II

Developed by Douglas Aircraft Corporation as an experimental missile, SPARROW II is not intended for fleet use.

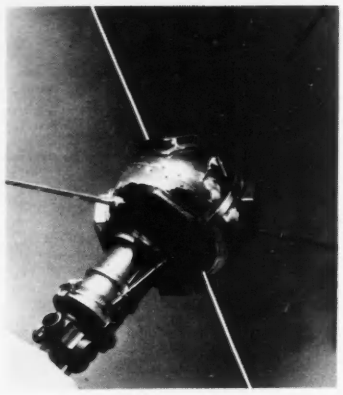
Contractors:

Primes:

Douglas Aircraft Co., Santa Monica, Calif.

Principal Subcontractors:

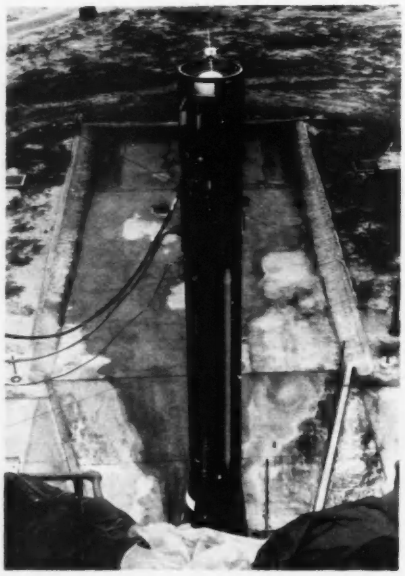
Douglas Aircraft Co., Santa Monica, Calif.
Airframe



SUCCESSFUL VANGUARD LAUNCHING OF MARCH 17, 1958, SHOWS COMPLEXITY OF MISSILES AND RELATIVE SIZE OF LAUNCHING VEHICLE TO SATELLITE.

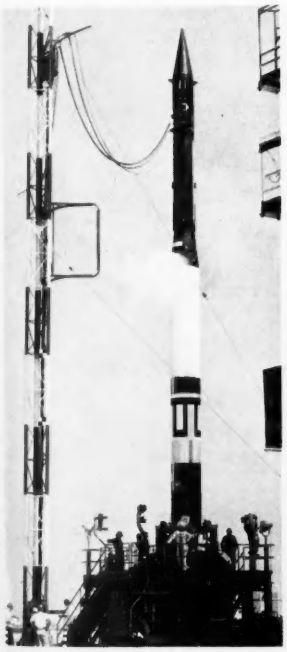
Left: THE SATELLITE. Weight, 3¼ lbs. Size, 6.4 inches.

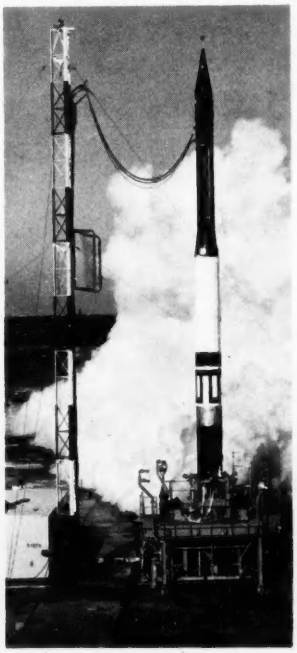
Below: VANGUARD third stage rocket which gives satellite final push is lowered in place. Crossbar affair on top of third stage and below satellite is "guidespider" which steadies third stage rocket in position so its separation from second stage will be straight and accurate.



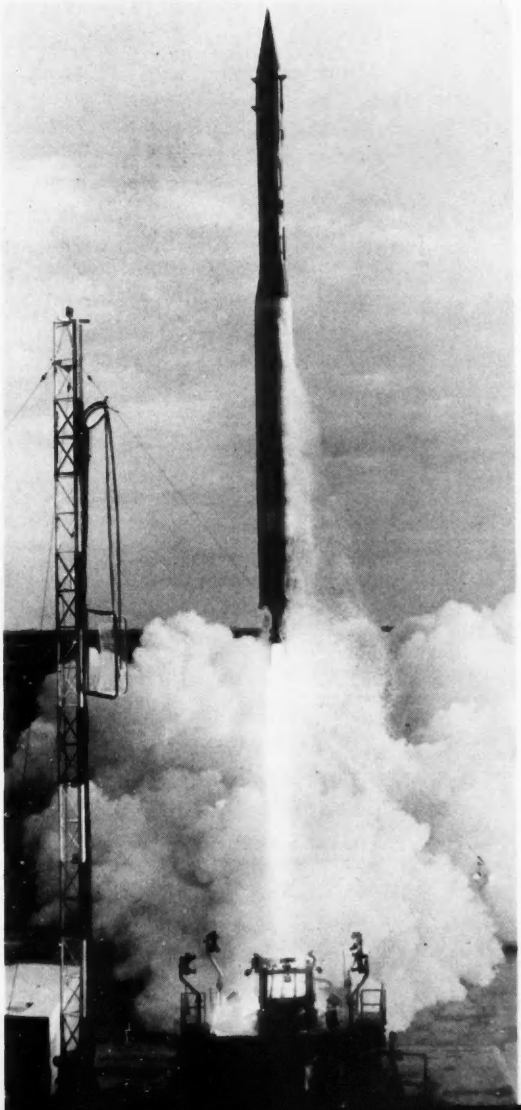
Above: SATELLITE and third stage are mounted in vehicle, nose cone angle-of-attack indicator is adjusted, and cone is installed.

***Left: IN THE BLOCK HOUSE** and at the launching site men have duties to perform, dials to watch during tedious count-down which precedes firing.*





Gantry crane backs away, the pad is cleared — and MISSILE AWAY!



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OFFICIAL U. S. NAVY PHOTOS

Aerojet General Gorp., Azusa, Calif.
Propulsion
Bendix Aviation Corp., Burbank, Calif.
Guidance
Naval Ordnance Laboratory, Corona, Calif.
Fuze - Warhead
Bendix Aviation Corp., Detroit, Mich.
Fuze
Elgin National Watch Co., Burbank, Calif.
Safety and Arming

SPARROW III

SPARROW III will augment its predecessor, SPARROW I, in fleet air defense. New missile is 12 feet long, weighs about 350 pounds, and can attain speed of over 1,500 mph within seconds after launching. It is an all-weather missile which can be fired above or through clouds with accuracy. Navy fighters can carry two to four SPARROW IIIs.

Contractors:

Primes:

Raytheon Manufacturing Co., Bedford, Mass.

Principal Subcontractors:

Raytheon Manufacturing Co., Bedford, Mass.
Airframe, guidance, fuze
Aerojet General Corp, Azusa, Calif.
Propulsion
Naval Ordnance Laboratory, White Oak, Md.
Warhead
Rheem Manufacturing Co., Downey, Calif.
Warhead
Elgin National Watch Co ., Safety and arming

NAVY Air-to-Surface

PETREL

PETREL is an air-to-surface weapon 24 feet long, with a wing-span of 13 feet, and weighing 3,800 pounds. It is powered by turbojet engine and uses radar homing for guidance. Although presently operational within the Fleet, it has been phased out of production.

Contractors:

Primes:

Fairchild Engine and Airplane, Co., Wyandanch, Long Island, N. Y.

Principal Subcontractors:

Fairchild Engine and Airplane Co., Wyandanch, Long Island, N. Y.
Airframe, propulsion, guidance, fire control equipment

Naval Ordnance Laboratory, White Oak, Md.
Fuze

Lockheed Aircraft Corp., Burbank, Calif.
Launcher

Naval Ordnance Plant, Forest Park, Ill.
Warhead

Bellock Corporation, New York, N. Y.
Fuze

BULLPUP

Designed for use by carrier-based Navy aircraft and shore-based Marine planes, BULLPUP is 11 feet long and weighs 540 pounds. BULLPUP is relatively inexpensive, highly accurate, and simple in design. Missile is used against comparatively small targets--pill-boxes, tanks, truck convoys, bridges, railroad tracks and marshalling yards. It has movable canard control surfaces, and is powered by solid-propellant rocket.

Contractors:

Primes:

The Martin Co., Middle River Md., and Orlando, Fla.

Principal Subcontractors:

Aerojet General Corp., Azusa, Calif.
Propulsion

Naval Ordnance Laboratory, Corona, Calif.
Fuze

Elgin National Watch Co., Elgin, Ill.
Fuze

CORVUS

CORVUS is an air-to-surface missile for use against heavily-defended areas. It can also be used against surface ships. It is designed of a size to be carried on carrier-based aircraft.

Contractors:

Primes:

Temco Aircraft Corp., Dallas, Texas

Principal Subcontractors:

Reaction Motors, Inc., Danville, N. J.
Propulsion

Texas Instrument Co., Dallas, Texas
Guidance

W. L. Maxson Corp., New York, N. Y.
Guidance

REGULUS I

REGULUS was first operational attack missile to join Fleet. It is surface-to-surface missile resembling conventional swept-wing jet fighter about 30 feet long. Range is in 500-mile class, and travels at maximum speed over 738 mph. Missile can carry nuclear warhead, and is guided by electronic brain. Turbojet engine provides propulsion for missile. REGULUS launching equipment can be installed in short period of time on several types of vessels at low cost, with only slight modification to ship itself. Missile can be fired from shore installations. Recoverable version of both REGULUS I and II is equipped with retractable landing gear. This version flies pilotless missions and lands intact on runways so it can be flown again. As many as 16 flights have been made by one REGULUS I recoverable missiles.

Contractors:

Primes:

Chance Vought Aircraft, Inc., Dallas, Texas

Principal Subcontractors:

Chance Vought Aircraft, Inc., Dallas, Texas
Airframe, guidance

Allison Division, General Motors Corp., Indianapolis, Ind.
Propulsion

Sandia Corp., Sandia Base, Albuquerque, N. M.
Warhead, fuze

REGULUS II

REGULUS II has been developed as direct product of REGULUS I program. REGULUS II is being flown in flight tests at Edwards Air Force Base. It flies faster, higher, and for greater distances than REGULUS I. Guidance system will be self-contained, making it less susceptible to enemy action. Missile is designed to exceed speeds of Mach 2.

Contractors:

Primes:

Chance Vought Aircraft, Inc., Dallas, Texas

Principal Subcontractors:

Chance Vought Aircraft, Inc., Dallas, Texas
Airframe

General Electric Co., Cincinnati, Ohio
Propulsion

A. C. Spark Plug, Milwaukee, Wis.
Guidance

Sandia Corp., Albuquerque, N. M.
Warhead, fuze

Texas Instrument Co., Dallas, Texas
Computer

POLARIS

POLARIS, Navy's IRBM, will be sea-based, intermediate range, ballistic missile for use against land targets. Current development is aimed at achieving solid-propellant rocket capable of ranges up to 1,500 miles. POLARIS development program is high on Navy's weapon priority list. Contracts were recently awarded for the production of three submarines which will be capable of launching POLARIS. Tactical mission of POLARIS will be to beat down fixed base air and missile defenses and pave way for carrier strikes aimed at destroying mobile or concealed primary targets.

Contractors:

Primes:

Lockheed Missile Systems Division, Sunnyvale, Calif.
Missile system

Interstate Electronics Corp., Anaheim, Calif.
Instrumentation

Westinghouse Corp., Sunnyvale, Calif.
Launcher design

Principal Subcontractors:

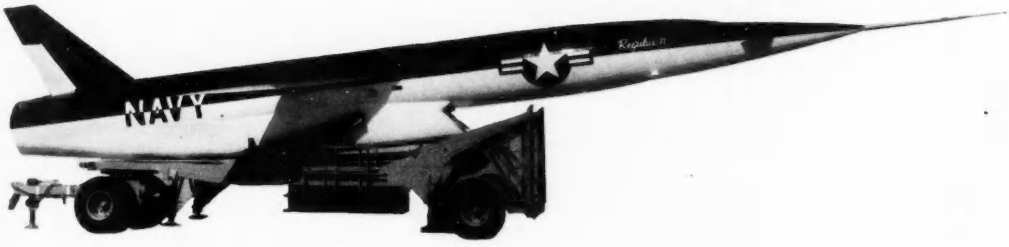
Aerojet General Corp., Sacramento, Calif.
Propulsion

Massachusetts Institute of Technology, Cambridge, Mass.
Guidance development

General Electric Corp., Pittsfield, Mass.
Guidance production and fire control

Atomic Energy Commission
Warhead

REGULUS II



RAT

RAT, code name for Rocket-Thrown Torpedo Weapon, is an amazing but relatively cheap automatic weapon's system, employing sonar, a rocket, parachute, and homing torpedo. RAT equipped destroyers can track enemy submarines and fire RAT automatically. Submarine kill-zone is increased many miles through use of RAT. Naval personnel believe that no possible defense exists against RAT, as knowledge of attack would not be gained until it is too late.

Contractors:

Primes:

Puget Sound Naval Shipyard, Bremerton, Wash.

Principal Subcontractors:

Librascope, Inc., Glendale, Calif.
Fire control system

Clevite Research Center, Cleveland, Ohio
Torpedo

Allegany Ballistics Laboratory, Cumberland, Md.
Rocket

WEAPON ABLE

Designed to give destroyers and new 931 class frigates greater range and latitude of attack, WEAPON ABLE, a 500 pound, 12.75 inch antisubmarine rocket can cover effectively a larger ocean area than old type depth charges. Equipped with conventional explosive charge, weapon is fired from launcher resembling conventional gun turret. Special fire-control system which aims rocket at enemy subs, and turret which can revolve in almost a complete circle, enable ship to fire rocket as soon as enemy submarine is detected. Weapon system is no longer in production.

Contractors:

Primes:

No prime contractors exsist for WEAPON ABLE. Bureau of Ordnance awarded contracts to several manufacturers for the production of component parts.

Principal Subcontractors:

Firestone Tire and Rubber Co., Akron, Ohio
Motor

The Hycon Manufacturing Co., Pasadena, Calif.
Motor

Universal Molded Products, Bristol, Va.
Warhead

The Pacific Division, Bendix Aviation Corp., North Hollywood, Calif.
Firing Mechanism

Western Electric Co., Burlington, N. C.
Firing Mechanism

TRITON

Following an overall review by Navy, TRITON production was cancelled on September 17, 1957. However, Navy is continuing modest support of missile's research and development team in order to incorporate most desirable features of TRITON into future missile systems.

Contractors:

Primes:

Johns Hopkins University, Silver Spring, Md.

Principal Subcontractors:

The McDonnell Aircraft Corp., St. Louis, Mo.
Goodyear Aircraft Corp., Akron, Ohio
Kearfott Company, Inc., Clifton, N. J.

AIR FORCE — Surface-to-Air

BOMARC

Long range surface-to-air guided missile designed for air defense to engage and destroy enemy far out from his target. BOMARC is approximately 47 feet long, with wing span of about 18 feet. Missile weight is about 15,000 pounds. It is rocket launched from vertical position after which it cruises on twin ramjet engines at supersonic speeds to its distant target. It is guided by most advanced electronic systems available. BOMARC has been successfully tested in a series of launchings from Patrick Air Force Base, Florida. Against high-flying drone aircraft, BOMARC has scored kills over 100 miles from launching point, and at an altitude above 60,000 feet. It has intercepted and destroyed drone targets at distances far beyond design range of any other surface-to-air missiles. Can carry either conventional or atomic warhead.

Contractors:

Primes:

Boeing Airplane Co., Seattle, Wash.

Principal Subcontractors:

Aerojet General Corp., Azusa, Calif.
Booster rocket

Marquardt Aircraft Co., Van Nuys, Calif.
Ramjet engines

Westinghouse Electric Corp., Baltimore, Md.
Homing radar, flight control group

MATADOR

Powered by Allison jet engine and controllable electronically in flight by ground crew, AF's MATADOR is ground launched by rocket booster from roadable launcher. Missile has wing-span of 28.7 feet, and length of 39.6 feet. Can deliver either conventional or nuclear warhead. Early models of MATADOR were numbered TM-61. TM-61 is being replaced operationally by TM-61C, which has greater range, improved guidance system, with high resistance to electronic countermeasures. TM-61C is capable of deep penetration into enemy territory, and can be deployed over wide expanses of water. Its operational altitude is in excess of 35,000 feet.

Contractors:

Primes:

The Martin Co., Baltimore, Md.

Principal Subcontractors:

Most of the components are from subcontractors and vendors; no major subsystems are subcontracted. The engine, APW-11 and inverter are GFAE.

MACE

MACE is newest MATADOR development, which includes self-contained navigation system. Improved guidance system and increased fuel load give MACE longer range than MATADOR.

Contractors:

Primes:

The Martin Co., Baltimore, Md.

Principal Subcontractors:

Goodyear Aircraft Co., Akron, Ohio

A. C. Sprak Plug, Milwaukee, Wis.

Inertial guidance

SNARK

Designed to carry an atomic warhead, AF's SNARK is powered by Pratt and Whitney J-57 turbojet engine. Missile can carry nuclear warhead at high speeds and high altitudes against far distant targets, by means of self-contained guidance system. Can operate independently of weather, day or night. Test flights for SNARK were conducted at Patrick AFB, Fla., and missile proved its accuracy at ranges up to 5,000 miles.

Contractors:

Primes:

Northrop Aircraft, Inc., Hawthorne, Calif.

Principal Subcontractors:

None

THOR

Inertial guidance systems for THOR are completely self-contained in missile and cannot be jammed or deterred from preset course. Current AF plans call for completely manned THOR squadron to be deployed overseas by December, 1958, just 36 months after inception of THOR project. Missile will carry an atomic warhead.

Contractors:

Primes:

Ramo-Wooldridge Corp., Los Angeles, Calif.
System

Douglas Aircraft Co., Santa Monica, Calif.

Principal Subcontractors:

Douglas Aircraft Co., Santa Monica, Calif.
Airframe

General Electric Co., Schenedtady, N. Y.
Nose-cone

North American Aviation, Los Angeles, Calif.
Propulsion

A. C. Spark Plug Co., Milwaukee, Wis.
Guidance

Atomic Energy Commission, Los Alamos, N. M.
Armament

Sandia Corp., Albuquerque, N. M.
Fuze design and development

ATLAS

ICBM ATLAS is launched by rocket engines developing many tons of thrust and millions of horsepower within seconds, which impart speeds well above 10,000 miles per hour. Full-scale ATLAS test missile are being studied by AF through a system of captive test stands which enables AF to evaluate performance of integrated propulsion system and airframe on ground. ATLAS has been fired sucessfully.

Contractors:

Primes:

Ramo-Wooldridge Corp., Los Angeles, Calif.
System

Convair, San Diego, Calif.

Principal Subcontractors:

Convair, San Diego, Calif.
Airframe

General Electric Co., Schenectady, N. Y.
Nose-Cone

North American Aviation, Los Angeles, Calif.
Propulsion

General Electric Co., Syracuse.
Guidance
Burroughs, Paoli, Penna.
Guidance
Atomic Energy Commission, Los Alamos, N. M.
Armament (Warhead)
Sandia Corp., Albuquerque, N. M.
Fuze
American Machine and Foundry, Pacoima, Calif.
Support (Auxiliary power unit)

TITAN

TITAN is two-stage ICBM which will back up ATLAS missile. Complete data on TITAN is still being kept confidential by DOD.

Contractors:

Primes:

Ramo-Wooldridge Corp., Los Angeles, Calif.
System
The Martin Co., Denver, Colo.

Principal Subcontractors:

The Martin Co., Denver, Colo.
Airframe
AVCO, Stratford, Conn.
Nose-Cone
Bell Telephone Laboratories, Whippany, N. J.
Guidance
Arma Bosch, Garden City, N. Y.
Guidance
Sperry Rand, St. Paul, Minnesota
Guidance
Aerojet General Corp., Sacramento, Calif.
Propulsion
Atomic Energy Commission, Los Alamos, N. M.
Armament
Sandia Corp., Albuquerque, N. M.
Armament
Aerojet General Corp., Sacramento, Calif.
Support (Auxiliary power unit)

FALCON

(GAR-1 radar guidance) (GAR-2, heat-seeking guidance) are guided, airborne rockets in supersonic speed range. Under development since 1947, FALCON was test-fired in 1950. Production was ordered in 1955, and rocket became operational in March, 1956. FALCON weighs slightly over 100 pounds, is approximately six feet long, and is powered by solid propellant. It is fired and guided electronically. Desgined for internal or under-wing installations, it can be carried in quantity by interceptor aircraft and launched miles from target. FALCON homes automatically on its target after release from aircraft. During development tests, FALCON knocked down target planes without use of explosive warheads.

Contractors:

Primes:

Hughes Aircraft Co., Culver City, Calif.

Principal Subcontractors:

Thiokol Corp., Redstone Arsenal, Ala.
Rocket motor

Willard Storage Battery Co., Cleveland, Ohio
Battery

AVCO Manufacturing Corp., Richmond, Ind.
Stabilizer, missile container, flipper

Vectron, Inc., Waltham, Mass.
Frequency converter

General Sintering Corp., Melrose Park, Ill.
Fuze, fuze arming

GENIE

GENIE or MB-1 is an air-to-air rocket with atomic warhead developed by Air Research and Development Command for air defenses purposes. GENIE was placed into weapons inventory of Air Defense Command in January, 1957. It was fired as an integral unit at AEC Nevada Test Site during Operation 'Plumbob' on July 19, 1957, from an F-89 Scorpion. Purpose of firing was to collect data on missile performance. Rocket once launced is unguided.

Contractors:

Primes:

Los Alamos Scientific Laboratory, Los Alamos, N. M.
Warhead

Douglas Aircraft Co., El Segundo, Calif.
Aircraft

AIR FORCE — Air-to-Surface

RASCAL

RASCAL is designed for launching from B-47 STRATOJET bombers at high altitude, and at such distances from target that bombers and crews are not exposed to local tactical defenses. In recent tests with air-to-surface RASCAL at AF Missile Development Center in New Mexico, four direct hits were scored on targets. Missile is designed to carry nuclear warhead. SAC has activated B-47 RASCAL unit.

Contractors:

Primes:

Bell Aircraft Corp., Niagara Fall, N. Y.

Principal Subcontractors:

Radio Corporation of America, Camden, N. J.
Guidance components

Texas Instrument Co., Dallas, Tex.
Guidance components

Arma Corp., New York, N. Y.
Guidance components

HOUND DOG

Successor to RASCAL is HOUND DOG. New air-to-surface missile to be carried by B-52 STRATOFORTRESS. Missile will carry nuclear warhead at supersonic speeds and strike ground targets hundreds of miles away with pin-point accuracy.

Contractors:

Primes:

North American Aviation, Downey, Calif.

Principal Subcontractors:

Complete list of principal subcontractors has not yet been released by AF

AIR FORCE — Diversionary

GREEN QUAIL

Along with another diversionary missile, the surface-to-surface BULL GOOSE, the GREEN QUAIL will be used to divert enemy attention and countermeasures away from actual weapon-carrying missile. Diversionary missiles will be part of SAC arsenal.

Contractors:

Primes:

McDonnell Aircraft Corp., St. Louis, Mo.

Boeing Aircraft Co., Seattle, Wash.
Airframe modification

BULL GOOSE

Contractors:

Primes:

Fairchild Engine and Airplane Corp., Hagerstown, Md.

Associate Contractor:

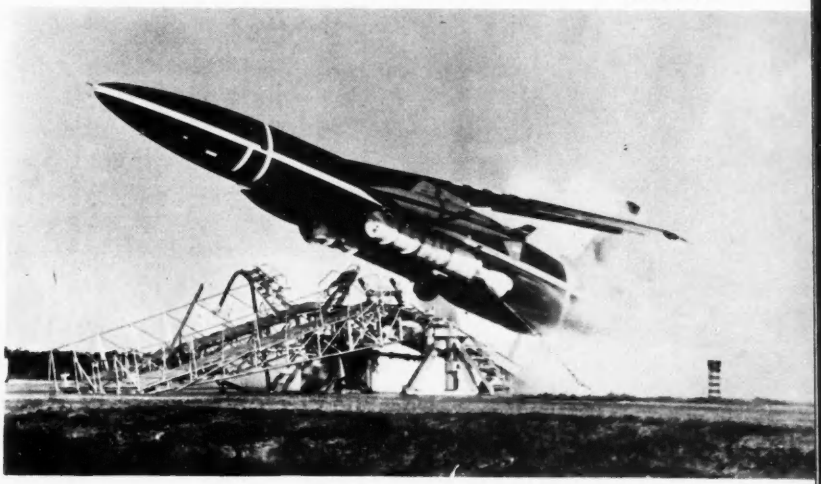
Ramo-Wooldridge Corp., Los Angeles, Calif.
Electronic

Principal Subcontractors:

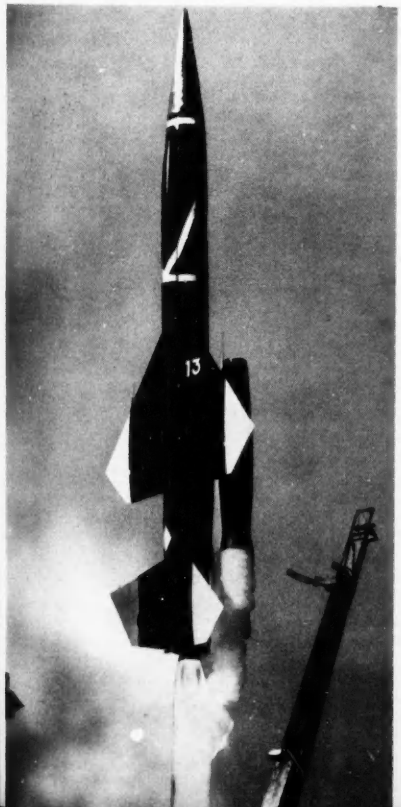
American Machine and Foundry Co., Brooklyn, N. Y.
Ground support equipment

Paul Omohundro Co., Los Angeles, Calif.
Airframe components

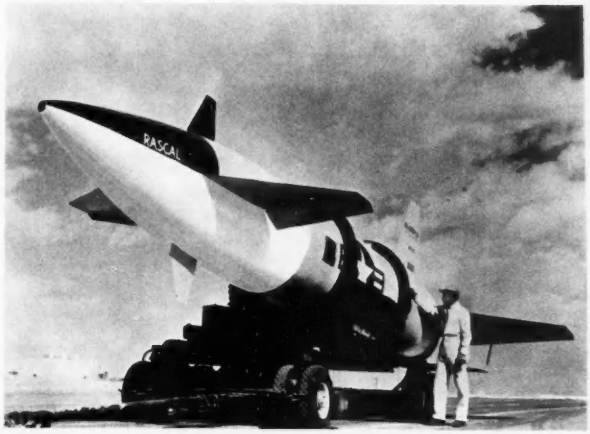
SNARK



BOMARC



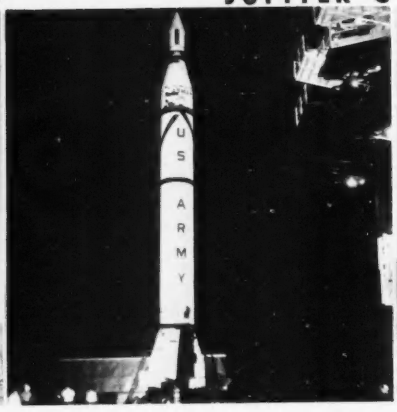
RASCAL



SIDEWINDER
in a Grumman F9F mount

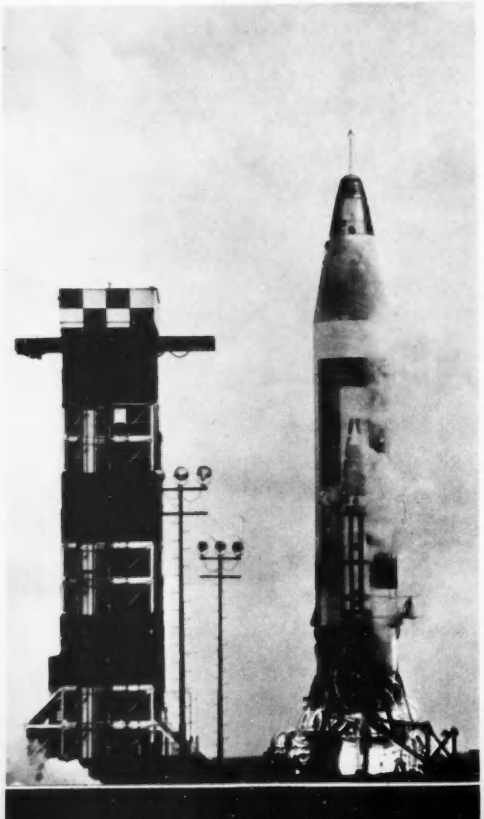
TALOS

JUPITER C

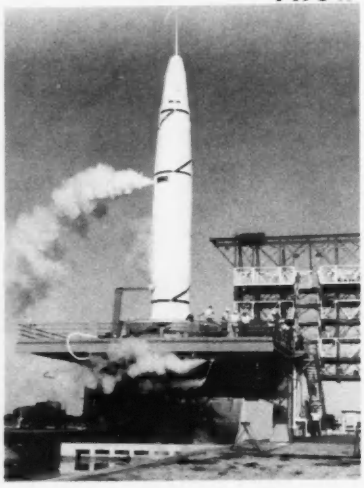


NIKE-AJAX

ATLAS



THOR

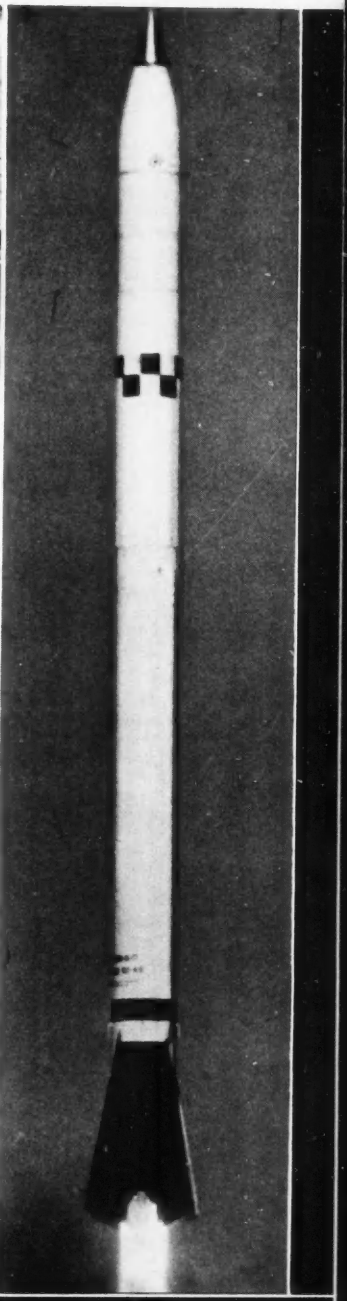


data

FALCON GAR-1D

HONEST JOHN

SPARROW I



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CORPORAL

Admiral® makes harmless radio waves behave like deadly radiation

Radiac simulator safely trains personnel in detecting atomic radiation

The quivering needle creeps up the scale, warning that nuclear radiation of dangerous intensity is present. So it appears to the trainee learning to explore for radiation fields with the aid of Admiral's radiac simulator. Actually, his instrument has been energized by harmless radio signals from a nearby special transmitter. In this way he learns his hazardous trade without harmful personal exposure.

The instrument he will carry in actual field work looks and behaves, in the presence of nuclear radiation, exactly as his radiac simulator did. This is Admiral's achievement... designing a simulator that essentially duplicates with radio signals the performance of an ionization chamber instrument. It was accomplished by designing the special transmitter and a receiving circuit with miniaturized omni-directional antenna to operate effectively in an instrument of limited size. With it the trainee may turn in any direction, yet obtain a true reading. This development is the unique product of Admiral's associated experience in both nuclear radiation and radio communications. Exceptional facilities are available for research, development and production in the fields of military electronics and nuclear radiation. Address inquiries to:

Admiral® CORPORATION
GOVERNMENT LABORATORIES DIVISION, Chicago 47, Ill.

ENGINEERS. The wide scope of work in progress at Admiral creates challenging opportunities in the field of your choice. Write Director of Engineering and Research, Admiral Corporation, Chicago 47, Illinois.

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- DISTANCE MEASURING
- RADAR BEACONS AND IFF
- CODERS AND DECODERS
- MISSILE GUIDANCE
- CONSTANT DELAY LINES
- TEST EQUIPMENT

The activities referred to in this advertisement

data gram

April 15, 1958

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KEEP UP TO DATE WITH DATA

Inconjunction with AF Base List released in March, DATA has just completed a map of AF Installations in Continental U.S. New map will prove to be an invaluable aid in locating AF bases now in operation and those that are planned for future construction. DATA also offers two new charts designed to save business and military men time and money. New revised Army and Navy charts include latest DOD changes.

MAP OF AF INSTALLATIONS IN CONTINENTAL U. S.

In response to requests, DATA has printed a large map (17 x 22 inches) which shows all Air Force installations in Continental U. S. Printed on sturdy paper suitable for wall mounting, map folds into quarters $8\frac{1}{2}$ x 11 for standard letter-size filing. $5. Order No. C-6.

REVISIONS OF TWO WASHINGTON PERSONNEL CHARTS

Revisions are now available for DATA Charts C-2, "Who's Who in the Navy," and C-3, "Who's Who in the Army." The new revisions are available to DATA readers on request. $1 for each chart.

Order Revisions by Order Number		Cost
Navy Chart Revised	C-2R	$1
Army Chart Revised	C-3R	$1

ARMY ANNOUNCES $100 MILLION TRUCK AND TRAILER CONTRACTS

with following items being procured by nationally advertised bids:

350 Semi-Trailer Gas Tankers
700 3/4-ton Cargo Trailers
3,000 1½-ton Cargo Trailers
75 3½-ton Cable Trailers
630 21-ton Trailers, Chassis

Remaining portion of contract is currently under negotiation with several automotive manufacturers. X 736 (11) ///Pent OPI 0319 259/

FACT SHEET ARMY ORDNANCE MISSILE COMMAND

Assigns responsibility for AOMC, states type of work to be carried on, and missiles to be tested. Includes thumb-nail sketches of Maj. Gen. Medaris, Dr. Wernher von Braun, and other top officials and officers of AOMC. Organizational chart is included in fact sheet.

X 737 (53) ///Pent OPI 0320 264/

DOD BUDGET AMENDMENT FOR FY 1959

New Obligational Authority by Appropriation Title.

AUGMENTATION PROGRAMS

	(Millions of dollars)
ARMY	
NIKE-ZEUS	175.0
Classified Project	3.7
Army Modernization	88.0
NAVY	
POLARIS	323.5
Classified Project	60.0
Anti-Submarine Warfare	112.0
Pacific Missile Range	36.1
AIR FORCE	
Solid Propellant ICBM/IRBM	50.0
GAM-77 (Hound Dog)	91.0
B-25, KC-135	423.0
TITAN	50.0
OSD (ARPA)	
NIKE-ZEUS	20.0
Solid Propellant ICBM/IRBM	20.0
Space Projects	140.0
Total Augmentations	1,592.3

5